Guide for the Small Public Water System

How to Hire an Engineer

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Washington State Department of Health

Division of Environmental Health
Office of Drinking Water

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For more information or additional copies of this publication contact:

Training and Outreach Section
Office of Drinking Water
Department of Health
PO Box 47828
Olympia, WA 98504-7828
(360) 236-3164

Mary Selecky
Secretary of Health

Rich Hoey
Acting Director, Office of Drinking Water

Public water systems often need the services of a professional engineer when system improvements are needed. Large privately owned systems and city or water district systems frequently have an engineer on staff or under contract. Smaller water systems must hire engineers as the need arises.

The system may have limited experience in hiring an engineer and may need help deciding what questions to ask and criteria to use in selecting an engineer, particularly if a specific process must be followed to be eligible for grants or loan reimbursement. This guide is designed to help small systems in such situations.

Why would a water system need to hire an engineer?

An engineer may perform the following services regarding the planning, design, and construction of water systems:

- Identifying source, storage, treatment, or water distribution system problems.
- Analyzing alternate solutions to these problems.
- Assuring that the system designed will function properly and be efficient and economical.
- Preparing detailed construction documents to implement the selected solution to the problems.
- Helping the system get plan approval from the Department of Health (DOH).
- Helping the system solicit and evaluate bids from contractors to perform the work.
- Inspecting and testing the quality of a contractor's work and making necessary reports and recommendations to the water system.
- Completing DOH certification documents to the extent that the engineer has direct knowledge of the as-built facilities.
- Preparing a Water System Plan document as required by DOH in situations such as:
    - The system is expanding.
    - The system has more than 1,000 connections.
    - A plan is required by loan or grant conditions.
    - The system has operational or water quality problems

What kind of engineer is needed?

There are many categories of engineering specialties. Two commonly employed by water systems are civil and environmenal engineers, but these are by no means the only ones that might be appropriate.

The engineer selected must be a Professional Engineer (PE) licensed by the state of Washington and should have experience with public water systems. It is not legal for engineers or land surveyors to undertake assignments for which they are not qualified (196-27 WAC).

What is a Professional Engineer (PE)?

A Professional Engineer is a person who has had specialized college education and engineering experience and who has been examined and is currently licensed by the state of Washington.

Why must a water system hire a PE?

- There are numerous technical details involved in designing and installing a water system. Some of them, such as friction loss, valve sizing and placement, soil conditions, and treatment alternatives, require the expertise, knowledge, and experience of a trained professional engineer
- State regulations (WAC 246-290-040) require that certain documents relating to public water systems be prepared by a PE licensed in the state of Washington. These include water system plans, project reports, and construction documents related to new public water systems, new sources, treatment (including chlorination), and extensions and alterations (except maintenance or replacements or other minor projects not requiring engineering expertise),
- WAC 246-290-040 also requires that a certificate signed by a PE be submitted to DOH within 60 days following completion of and prior to use of any project approved by the department. The certificate states that the PE has inspected the project and that it has been constructed in accordance with the approved construction documents.

How does a water system find an engineer with expertise in water systems?

There are several ways of finding engineers who may be interested in and capable of providing the needed services.

- Consult the yellow pages of the telephone books for larger towns and cities. Listed under “Engineers” will be various categories of engineering specialties.
- Contact other water systems to determine which engineers have provided them with satisfactory service.
- Get an engineers listing from a DOH Office of Drinking Water region. While DOH can’t recommend an engineer, the lists show those who have made submittals to the department in the past.

What criteria should be considered in selecting an engineer?

The primary considerations in selecting an engineer are **relevant experience** in the types of services needed and **demonstrated ability to serve in a timely and effective manner**. The basic criteria to use in the selection process include:

- **Knowledge** — The engineer should have specialized education or training in the aspect of public water system planning or engineering that the small water system needs.
- **Experience** — The engineer should have professional engineering experience with similar water system projects for a similar size system.
- **Ability to Serve** — The engineer should demonstrate that sufficient uncommitted time and other resources are available to perform the services within the time needed by the water system.
- **Communication** — The engineer should demonstrate the ability to communicate in a thorough and timely manner as needed to keep the water system fully and satisfactorily informed.
- **References** — The engineer should provide three or more references from previous clients for whom similar water system engineering services have been performed. In addition to a contact person, information on the type of project, year the project was undertaken, total actual versus estimated cost of the project, and the name of the engineer in charge of the project should be provided.

If an engineering firm is hired, these criteria should apply not only to the firm, but also to the specific engineer or engineers who will actually be doing the work. Many large engineering firms have people who meet all these criteria, but they will not actually be working on all of their clients' projects.

What procedures should be used to select an engineer?

- Contact at least three engineers, briefly discuss what engineering work is needed, and find out if they are interested. If a grant or loan is involved, a more formal process may be required. Check with the funding agency.
- Interview three or more of the engineers expressing an interest, based upon the selection criteria previously outlined.
- Contact their references and ask how the engineer performed the assignment. If possible, visit the references' water systems and their completed projects.
- Rank the engineers in order of preference.
- Ask the first-ranked engineer to submit a written proposal. The proposal should include such details as what work will be accomplished, how the work will be done, how much time it will take, what fees will be charged, and what payment method will be acceptable.

- Meet with the engineer, if necessary, to discuss any items not fully addressed in the proposal.
- If the proposal is acceptable, proceed to the contract stage. Generally the engineer will provide the contract, including a mutually acceptable scope of work. Example contracts may be available from other water systems. Have the contract reviewed thoroughly by your water system's attorney.
- If the terms and conditions of a contract are mutually acceptable, let the other engineers who were interviewed know of the selection.
- If contract terms cannot be mutually agreed upon, end negotiations with the engineer and begin to negotiate with the second ranked engineer.
- If a grant or loan is involved, have the funding agency review the contract before signing it.

What services should the engineer perform?

There is no standard package of services that engineers perform. The services are tailored to the specific needs of each small water system. However, there are generally three phases of a design and construction project that the engineer is involved in: planning and preliminary design, final design. and construction.

- **Planning and Preliminary Design Phase** - Involves studying the problem, determining alternate solutions, outlining the basic concept, making preliminary cost estimates, and establishing project feasibility. The water system should not go into a project with a preconceived idea of what is needed. The engineer should not be expected to just give a "seal of approval," but should actually perform an analysis of alternatives.
- **Final Design Phase** - Includes design, field work, preparation of construction documents and cost estimate, as well as submittal to and obtaining approval of all required agencies (not just DOH). The engineer may assist in preparing a grant or loan application for the construction of the project. If a grant or loan is helping to pay for the project, additional requirements will need to be included in the bidding documents the engineer prepares. The engineer should be familiar with the requirements, or may need to consult with the funding agency.
- **Construction Phase** - May involve construction staking, managing the hiring of a contractor, surveillance and inspection of the contractor's work during construction, review of contractor's progress payment requests, and other matters required to assist the system in the construction phase. Preparation of as-built drawings and completion of the DOH as-built certification is also often included in this phase.

How are the costs of engineering services determined?

Engineering fees may be based on a set fee per day, cost times a factor, lump sum, or percentage of project cost. Whatever financial arrangements are made, the specifics of services to be performed and how they are to be reimbursed should be fully agreed upon before a contract is signed. Details that commonly need to be worked out include:

- Will travel time be an additional charge and, if so, at what rate?
- Will the fee include all consultations, or will each meeting above a set number be an additional charge?
- How will the water system be charged if DOH requires changes or additions to the engineer's submittal?
- Will a particular pay option provide incentives for the engineer to save money for the water system?

If You Have Further Questions

Contact your DOH Office of Drinking Water Region:

Eastern Regional Office, Spokane — 509-456-3115

Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman, and Yakima counties.

Northwest Regional Office, Kent — 253-395-6750

Island, King, Pierce, San Juan, Skagit, Snohomish, and Whatcom counties.

Southwest Regional Office, Olympia — 360-664-0768

Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Kitsap, Lewis, Mason, Pacific, Skamania, Thurston, and Wahkiakum counties.